Effect of Particulate Matter Air Pollution on Hospital Admissions and Medical Visits for Lung and Heart Disease in Two Southeast Idaho Cities

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Background: As a follow-up to a 2001 report for the US EPA Eastern Michaud Flats Contamination Superfund site, the Agency for Toxic Substances and Disease Registry (ATSDR) conducted a time series analysis to study the effects of breathing particulate matter (PM) in Chubbuck and Pocatello, Idaho. The major sources of exposures to the communities during the study period (1994–2000) were from the phosphate industry, wind-blown dusts, and wood burning. The study attempted to address the community's concerns about lung and heart disease in relation to PM exposures.

Methods: We investigated the relation between daily PM_{10} (<10 μm in aerometric diameter) exposures during the time period 1994–2000 with admissions and medical visits (i.e., emergency room, urgent care, and family practice) for respiratory and cardiovascular disease. Within generalized linear models, time, weather, influenza, and day-of-week effects were controlled. Control variable and sensitivity analyses were conducted. Potential confounding by co-pollutants was analyzed.

Results: Respiratory disease admissions and visits increased (7.1–15.4% per 50 $\mu g/m^3$ increase in PM_{10}) for each age group analyzed (all ages, 0–17, 18–64, 65+, and combined 0–17/65+ years), with the highest increases in children and the elderly. Multiple comparison analysis suggests the results probably did not occur by chance. Evidence of an association between PM_{10} with cardiovascular disease was not found.

Conclusions: The study supports the community's concern regarding excess respiratory disease, especially in children and the elderly, but not for cardiovascular disease. The data used represented a wide range of disease severity, supporting the suggestion by the US EPA that evaluating only hospital admission or emergency room visit effects may underestimate the overall respiratory morbidity due to acute PM exposures. Few, if any, published time series studies have evaluated the effects of PM air exposures by combining hospital admissions with medical visit data for smaller populations.

Disclaimer: *The findings and conclusions in this presentation have not been formally disseminated by the Agency for Toxic Substances and Disease Registry and should not be construed to represent any agency determination or policy.*

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